AXMINSTER Engineer SERIES SIEG

Code **505103**

XN2 Super Tilt Head Mill Drill

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Warning **The symbols below advise that you follow the correct safety procedures when using this machine.**

Fully read manual and safety instructions before use

Ear protection should be worn

Eye protection should be worn

Foot protection should be worn

Copied from CE Certificate

The undersigned, Zhanghai Long authorised
by Shanghai SIEG Machinery Co., Ltd.
No.555 Caofeng Rd. South to No.17 Bridge of
Caoan Rd. Shanghai, P.R. China

declares that this product:

MILLING MACHINE

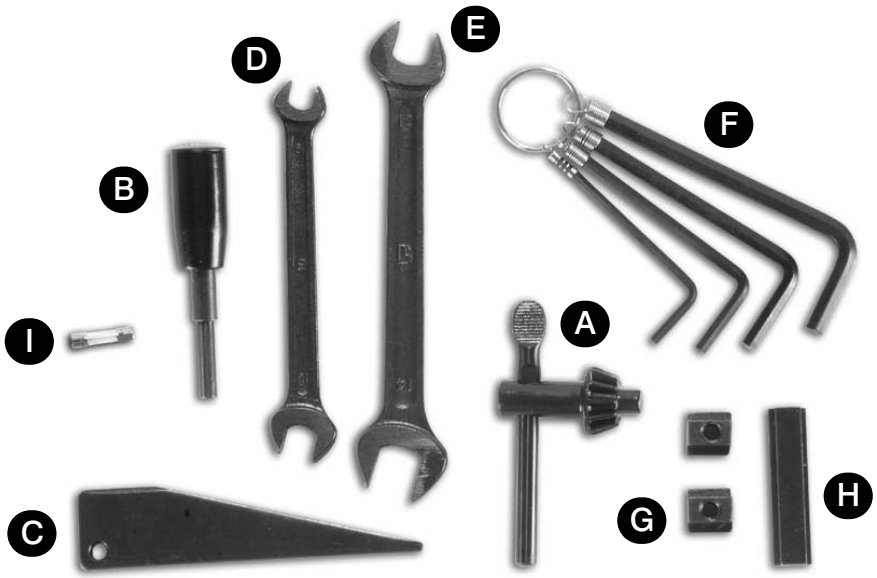
XN2

manufactured by Shanghai SIEG Machinery Co. is
in compliance with the following standards or
standardisation documents in accordance with
Council Directives

EN 61029-2-5: 2002
EN 61029-1:2000+A11:2003+A12:2003
EN 55014-1:1993+A1:97+A2:99
EN 55014-2:1997
EN 61000-3-2:2000
EN 61000-3-3:1995/+A1:2001

What's Included

Model Number		XN2
1 No.		SIEG Super X2 Mill with (1-13mm Chuck & B16 Taper)
1 No.	**A**	Chuck Key
1 No.	**B**	Tommy Bar
1 No.	**C**	Morse Taper Drift
1 No.		Oil Can
1 No.	**D**	8 x 10mm Double End Spanner
1 No.	**E**	12 x 14mm Double End Spanner
1 No.	**F**	3,4,5,6mm Hex Keys
2 No.	**G**	'T' Slot Keepers
1 No.	**H**	Position Key
1 No.	**I**	Spare Fuse
1 No.		Guarantee Card
1 No.		Instruction Manual



Please read the Instruction Manual prior to using your new machine; as well as the installation procedure, there are daily and periodic maintenance recommendations to help you keep your machine on top line and prolong its life. Keep this Instruction Manual readily accessible for any others who may also be required to use the machine.

Having unpacked your machine and its accessories, please check the contents against the equipment list "What's Included", if there are any discrepancies, please contact Axminster Tool Centre using the procedures laid down in the catalogue. Please dispose of the packaging responsibly, much of the material is bio-degradable. The machine and its accessories will arrive coated with heavy corrosion preventative grease. This will need to be cleaned from the machine, its components and accessories prior to it being set up and commissioned. Use coal oil, paraffin or a proprietary degreaser to remove the barrier grease. Be warned, it will stain if you splash it on clothing etc., wear overalls, coverall et al., rubber gloves are also a good idea, as is eye protection if your cleaning process tends to be a little bit enthusiastic. After cleaning, lightly coat the exposed metal surfaces of the machine with a thin layer of light machine oil. N.B If you used paraffin/kerosene make sure you apply this thin film sooner rather than later.

Good Working Practices/Safety
The following suggestions will enable you to observe good working practices, keep yourself and fellow workers safe and maintain your tools and equipment in good working order.

WARNING!! **KEEP TOOLS AND EQUIPMENT OUT OF THE REACH OF YOUNG CHILDREN**

Mains Powered Tools

Primary Precautions
These machines are supplied with a moulded 13 Amp. plug and 3 core power cable. Before using the machine inspect the cable and the plug to make sure that neither are damaged. If any damage is visible have the damaged item inspected/repaired by a suitably qualified person. If it is necessary to replace the plug, it is preferable to use an 'unbreakable' type that will resist damage on site. Only use a 13 Amp plug, and make sure the cable clamp is tightened securely. Fuse as required. If extension leads are to be used, carry out the same safety checks on them, and ensure that they are correctly rated to safely supply the current that is required for your machine.

Work Place/Environment
The machine is not designed for sub-aqua operation, do not use when or where it is liable to get wet. If the machine is to be used outside and it starts to rain, stop work and move it inside. If machine has got wet; dry it off as soon as possible, with a cloth or paper towel. Do not use 230V a.c. powered machines anywhere within a site area that is flooded or puddled, and do not trail extension cables across wet areas. Keep the machine clean; it will enable you to more easily see any damage that may have occurred. Clean the machine with a damp soapy cloth if needs be, do not use any solvents or cleaners, as these may cause damage to any plastic parts or to the electrical components.

Keep the work area as uncluttered as is practical, this includes personnel as well as material.

(Under no circumstances should CHILDREN be allowed in work areas)

It is good practice to leave the machine unplugged until work is about to commence, also make sure to unplug the machine when it is not in use, or unattended. Always disconnect by pulling on the plug body and not the cable. Once you are ready to commence work, remove any tools used in the setting operations (if any) and place safely out of the way. Re-connect the machine.

Carry out a final check e.g. check the cutting tool, drill bit, saw blade etc., is securely tightened in the machine, check you have the correct speed and function set, check that the power cable will not 'snag' etc.

Make sure you are comfortable before you start work, balanced, not reaching etc.

If the work you are carrying out is liable to generate flying grit, dust or chips, wear the appropriate safety clothing, goggles, gloves, masks etc., If the work operation appears to be excessively noisy, wear ear-defenders. If you wear your hair in a long style, wearing a cap, safety helmet, hairnet, even a sweatband, will minimise the possibility of your hair being caught up in the rotating parts of the machine, likewise, consideration should be given to the removal of rings and wristwatches, if these are liable to be a 'snag' hazard. Consideration should also be given to non-slip footwear, etc.

DO NOT work with cutting or boring tools of any description if you are tired, your attention is wandering or you are being subjected to distraction. A deep cut, a lost fingertip or worse; is not worth it!

DO NOT use this machine within the designated safety areas of flammable liquid stores or in areas where there may be volatile gases. There are very expensive, very specialised machines for working in these areas, **THIS IS NOT ONE OF THEM.**

Check that cutters, drills, blades etc., are the correct type and size, are undamaged and are kept clean and sharp, this will maintain their operating performance and lessen the loading on the machine. Above all, **OBSERVE....** make sure you know what is happening around you, and **USE YOUR COMMON SENSE.**

Basic Safety for Machine Tools

KNOW YOUR MACHINE TOOL

Read and understand the owner's manual and labels affixed to the tool. Learn its application and limitations as well as specific potential hazards peculiar to the tool.

KEEP GUARDS IN PLACE

Keep all guards in place. They are there for your protection and do not interfere with the correct operation of your machine.

REMOVE ADJUSTING KEYS AND WRENCHES

Form the habit of checking to see that keys and adjusting wrenches are removed from the machine before turning it on.

KEEP WORK AREA CLEAN

Cluttered areas and benches invite accidents. Floors must not be slippery due to liquids or dust. Make sure you clean up any waste materials on completion of work.

AVOID DANGEROUS ENVIRONMENTS

Do not use power tools in damp or wet locations or expose them to rain. Keep work area well lit. Provide adequate space surrounding the work area.

KEEP CHILDREN AWAY FROM WORK AREA UNLESS UNDER CLOSE SUPERVISION

All visitors should be kept a safe distance from work area. Children are naturally curious; therefore ensure they are closely supervised when they are near the work area.

MAKE WORKSHOP TAMPER PROOF

Many machines have lockable switches that can be secured with a small padlock or have a removable key. Please make use of them to prevent unauthorised operation of your machines.

DO NOT FORCE TOOL

It will do the job better and safer at the rate for which it was designed. Develop a patient approach to the work, you will get better results in the finished product.

WEAR PROPER CLOTHING

Do not wear loose clothing, gloves, neckties or jewellery that can catch in moving parts of machinery. Non-slip footwear with steel toecaps is recommended. Wear protective hair covering to contain long hair. Roll up long sleeves to above the elbow.

SECURE WORK

Where applicable use clamps or a vice to hold work. This leaves both hands free to operate the tool correctly and thus produces better results.

DIRECTION OF FEED

Feed work into a blade or cutter against the direction of rotation of the blade or cutter only. This will reduce the danger of kick back which is a serious hazard. Similarly, when using a lathe, feed the cutting edge of the tool against the direction of rotation!

USE SAFETY GOGGLES AND FACE PROTECTION

Wear safety goggles (complying to relevant standards) at all times. Normal spectacles only have impact resistant lenses and are NOT sufficient. Also use face or dust masks if the cutting operation is dusty (connection of machine to a dust extractor is preferred). Always wear ear defenders for cutting, sawing, planing or routing operations. Your hearing can be permanently damaged if exposed to high noise levels for long periods of time.

DO NOT OVERREACH

Keep proper footing and balance at all times.

MAINTAIN TOOL WITH CARE

Keep tools sharp and clean at all times for the best and safest performance. Follow the manufacturer's instructions for lubricating and sharpening and also for changing accessories.

DISCONNECT POWER FROM THE TOOL

Before servicing or when changing accessories always disconnect the power supply to avoid accidental starting.

AVOID ACCIDENTAL START UP

Although most machines are now equipped with NVR switches, develop the habit of making sure the switch is in the "OFF" position before connecting the machine to the power supply.

USE RECOMMENDED ACCESSORIES

Consult the owner's manual for details of any manufacturer's accessories or contact your supplier for details of recommended accessories. Follow the instructions that accompany the accessory. The improper use of accessories may cause hazards. The fitting of non-recommended accessories may also cause hazards.

CHECK DAMAGED PARTS

Before using the tool, a guard or other part that is damaged should be carefully checked to ensure that it will operate properly and perform its intended function. Check for alignment of moving parts, breakage of parts, mounting and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced. A parts list is to be found at the back of your operator's manual.

NEVER LEAVE A MACHINE RUNNING UNATTENDED

ALWAYS turn power off. Do not leave machine until it comes to a complete stop.

DRUGS, ALCOHOL AND MEDICATION

NEVER operate tools whilst under the influence of drugs, alcohol or after taking medication.

USE THE CORRECT TOOL

Do not force a tool or attachment to do a job for which it was not designed. This is dangerous workshop practice.

Specification

Code	**505103**
Power	230V 50Hz 500W
Drilling Capacity (ST 37)	13mm/M8
Face Milling Capacity	30mm
End Milling Capacity	16mm
Throat	160mm
Distance between Spindle/Table	320mm
Thread Pitch of Lead Screw	2mm
Lead Screw Diameter	M14
Spindle Taper	MT-2 / M10
Spindle Speed (Variable)	50-2500rpm
Speed Ratio	1:2
Spindle Stroke	60mm
Column Tilting Range	45˚Left / 30˚ Right
Max. Table Stroke x-axis	250mm
Max. Table Stroke y-axis	160mm
Max. Table Stroke k-axis	300mm
Max. Tapping Size (HT200)	M8
Max. Tapping Size (45)	M6
Max. Milling Diameter	ø30mm
Table Size	130 x 500mm
Overall Size: (LxWxH)	610 x 610 x 780mm
Weight	127kg

Definitions

‘X’ Axis. This is the axis described by the work table as it is moved side to side. Normally, movement that moves the tool to the right in the workpiece is referred to as +ve ‘X’, and movement that moves the tool to the left in the workpiece is referred to as –ve ‘X’. Where the initial position of the tooling and the worktable is designated 0,0. (Horizontal plane only).

‘Y’ Axis. This is the axis described by the work table as it is moved from front to back. (Traverse) Normally movement that moves the tool to the front in the workpiece is referred to as-ve ‘Y’, and movement that moves the tool to the rear in the workpiece is referred to as+ve ‘Y’. Where the initial position of the tooling and the worktable is designated 0,0.(Horizontal plane only).

‘Z’ Axis This is the axis described by the worktable in the vertical plane. (Not possible with this machine). However, to establish a point in space, the co-ordinates can be transferred to the ‘tip’ of the tooling, whereby, if we assume that the tool and the worktable in their initial positions, where designated 0,0,0, (Horizontal and vertical planes) any point above the tool tip is referred to as +ve ‘Z’, and any point below the tool tip is referred to as -ve ‘Z’

Initial Assembly

Ideally, your mill should be installed close to a correctly rated power supply, in a warm dry environment, well ventilated and illuminated by bright clear natural light, with adequate access all around the machine, and sufficient adjacent storage space for your tools, accessories and material.

The Mill is best mounted on a rigid bed; this is to ensure stability of the machine and to attenuate any vibration that is generated when the machine is running.

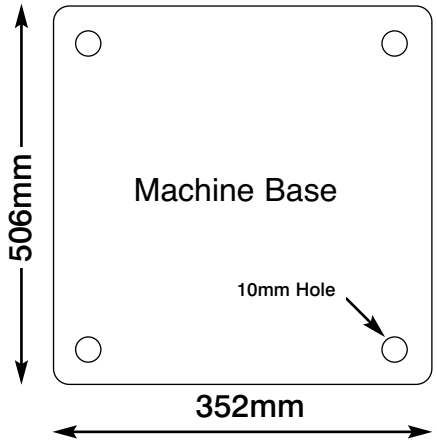
The bed should be flat and set level in both planes, and at a height that enables comfortable operation of the machine. It is not necessary to anchor the bed through to the floor, but it must be stable enough to remain immovable during any normal forceful operations (especially tightening) carried out whilst operating your mill.

If you are preparing your own bed for the machine, it should be at least 552mm long by 390mm wide; (to cover the footprint of the base (506 x 352), you will need to drill 4 No. 10mm holes to allow for bolt fixing. (See Fig A)

Bolt the mill to the bed using M10 nuts,caphead bolts and washers.

Locate and identify the 3 rod handles from the packing box. Fit these to the 3 wheel handles, (Work table control, traverse feed control, head raise and lower control.)

Fig A



Base casting This is the stand for the milling m/c. It is a square casting with a seated flange to the rear, which mounts the main tool post. There are four holes to each corner to be bolted to a bench or stand. There is a dovetail slide machined to the front service of the base, to mount the traverse slide of the work table.

Main tool post This is the column of the mill, with a dovetail slide machined on the front which the milling head is mounted.

Rise & fall drive screw The rise and fall is anchored in a machined housing at the top of the tool post. It has a wheel with a graduated ring (thimble), so the movement of the slide can be measured. The wheel is connected to a rod shaft that enable the screw to be turned, allowing the head to move up and down. Turning the handle clockwise will raise the head and anti-clockwise to lower it.

Tilt housing assembly The tilt housing is a turntable which is integrated in the milling head. Mounted on top of the tool post is a threaded locking pin that locks the head at 90˚ degrees (See fig 3), turning the 10mm nut (clockwise) will drive the pin up thus unlocking the head. On either side of the head there are two rounded nuts that clamp the tilt assembly in position. Loosening the nuts will allow the head to pivot + 45˚ or - 45˚ degrees, using the scale and pointer on the right hand side of tilt housing. (See figs 1 & 7)

Traverse slide The traverse slide casting mounts onto the dovetail slide of the base casting. There is a gybe strip fitted to the left side dovetail to maintain the fit. In the front face of the slide is a machined housing which mounts and anchors the drive shaft for the traverse feed. Under the slide (on the base) is a threaded dog mounted in a fixed position, through which the traverse drive shaft is threaded so as to enable the slide to be driven back and forth. The top of the traverse slide has a female dovetail machined into it, perpendicular to the lower dovetail. This marries with the dovetail on the underside of the worktable. The front face of the dovetail is fitted with a gybe strip to maintain the fit. The top of the slide also has a fixed threaded dog mounted to it, through which the drive shaft of the worktable is threaded to allow the worktable to be driven from side to side. In between the grubscrews and locknuts of the gybe strip adjustor is M4 caphead bolt handles that can be driven forward to clamp the gybe strips against the dovetails to enable the traverse and longitudinal movements to be locked in position.

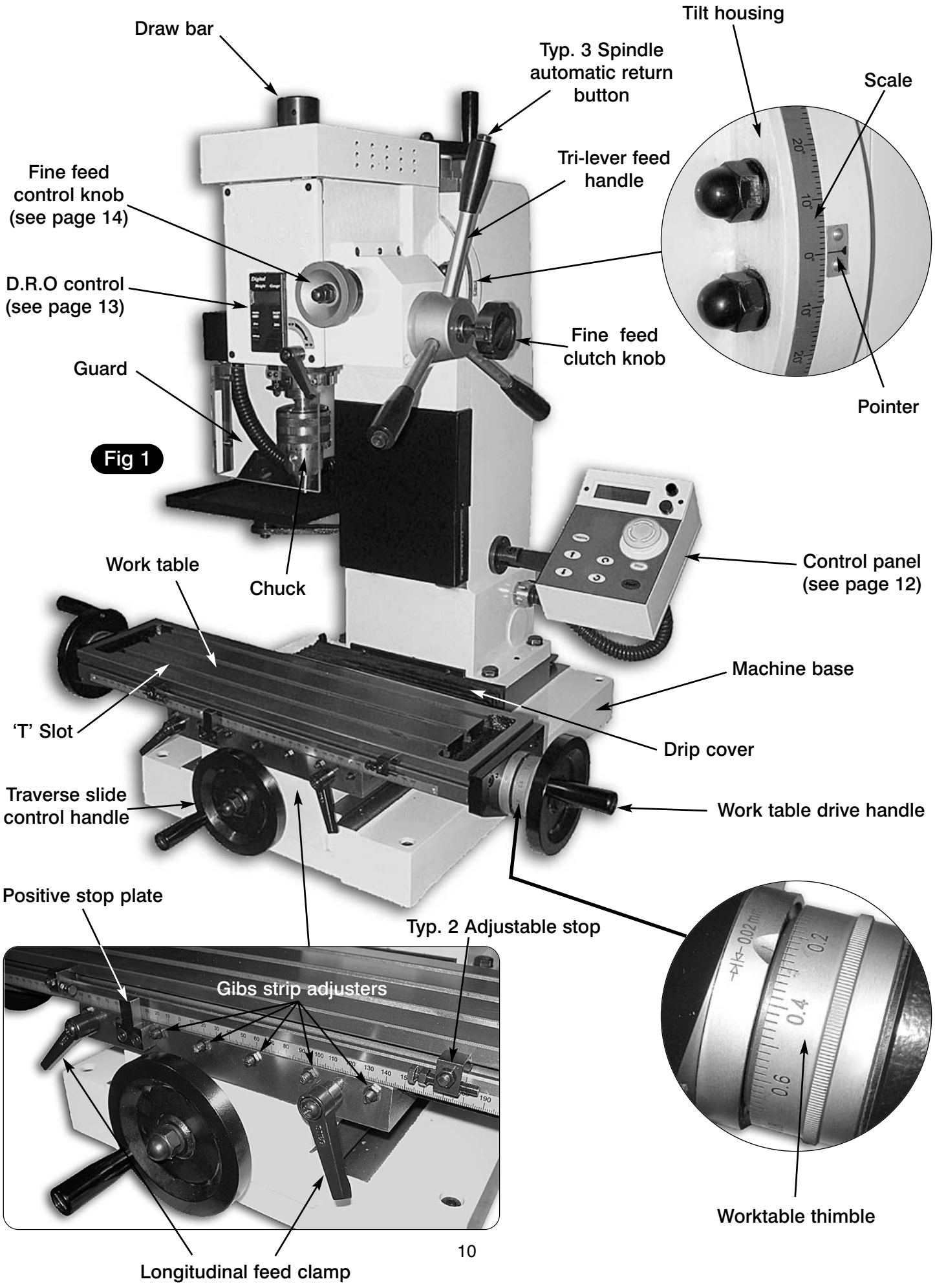
Traverse slide control The traverse slide is driven using the wheel and rod handle at the front of the machine. Behind the boss of the handle is a graduated ring (thimble) so that the movement of the slide can be measured. The thimble is held to the drive shaft by friction, and can be pre-positioned to a predetermined start or stop dimension.

Work table The worktable is a machined casting 500mm long by 130mm wide. There is a dovetail section machined in the underside to mate with the traverse slide. There are 4 x 16mm open ended ‘T’ slots machined in the table along its length, to facilitate the fixing of machine vices or clamps. The worktable is mounted onto the traverse slide. The right end face of the worktable has a housing machined in it to mount and anchor the drive shaft assembly.

Work table control The Worktable slide is driven using the wheel and rod handle at each end of the table. Behind the boss of the handle is a graduated ring (thimble) so that the movement of the worktable can be measured. The thimble is held to the drive shaft by friction, and can be pre-positioned to establish a predetermined start or stop dimension.

Parts Description

Milling head	**This is the 'milling machine' and the descriptions of its various parts and components are detailed as follows:-**
Milling head casting	The main casting to which all the components are attached. The head has a dovetail housing machined at the rear, which allows the casting to be fitted to the Main Tool Post. The left side of the dovetail slide is fitted with a gybe strip to maintain the fit.
Head clamp	Similar to the traverse and longitudinal slides, centrally located between the gybe strip adjusters and locknuts there are two M4 bristol handled bolts that clamp the gybe strip against the slide to effect a locking action for the rise and fall of the head.
Motor & gearbox	the gearbox assembly is mounted inside the head box casting. The motor drive is geared through to the spindle.
Tri-lever handle	Three levered handle that is used to drive the quill (and hence the chuck or the tool) up and down. The boss of the handle is fitted to the end of a 'splinted' gear shaft. This 'splinted' gear is, in turn, engaged in the rack cut into the quill body. The other end of the 'splinted' shaft is engaged in a contra-wound spring, this provides counter balance to the weight of the quill, arbor, chuck and drill, giving a more controlled 'feel' during drilling operations. It also retracts the quill when drilling is completed.
Draw bar cover	A steel threaded cover that screws into the top of the Motor Gearbox assembly, to afford protection from the rotating top of the draw bar, when the quill is at the top of its travel.
Draw bar (unseen)	This is a metal rod, threaded M10 at one end and with an 8mm squared shank and flange machined on the other. It is fitted through the spindle mandrel to hold the fitted tool/tooling hard into the No2 MT taper of the spindle shaft.
Motor	230V d.c. motor rated at 500W.


Draw bar
Typ. 3 Spindle automatic return button
Tilt housing
Scale
Tri-lever feed handle
Fine feed control knob (see page 14)
D.R.O control (see page 13)
Fine feed clutch knob
Guard
Pointer
Fig 1
Work table
Chuck
Control panel (see page 12)
Machine base
'T' Slot
Drip cover
Traverse slide control handle
Work table drive handle
Positive stop plate
Typ. 2 Adjustable stop
Gibs strip adjusters
Worktable thimble
Longitudinal feed clamp

Parts Illustration & Description

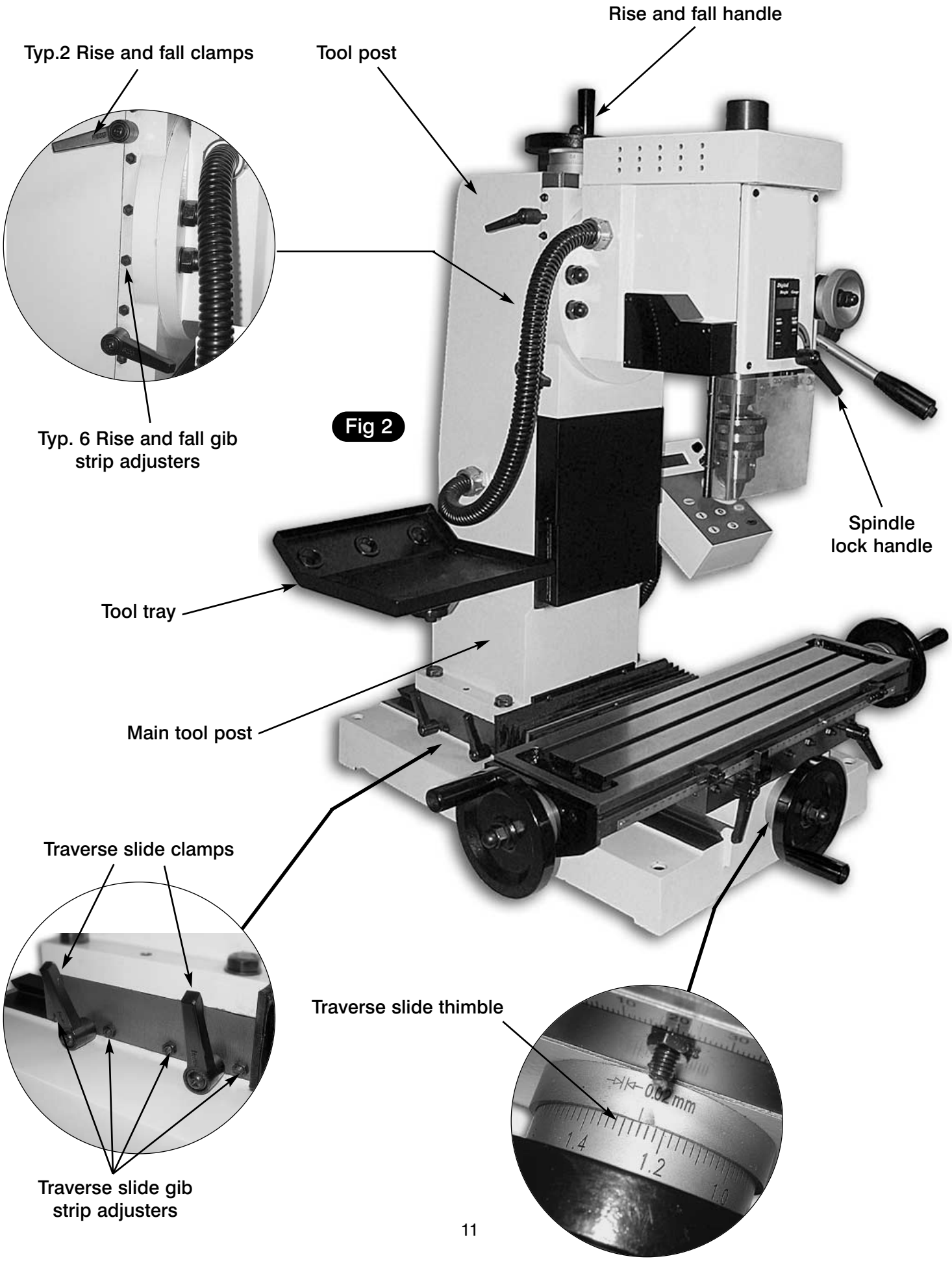


Fig 2

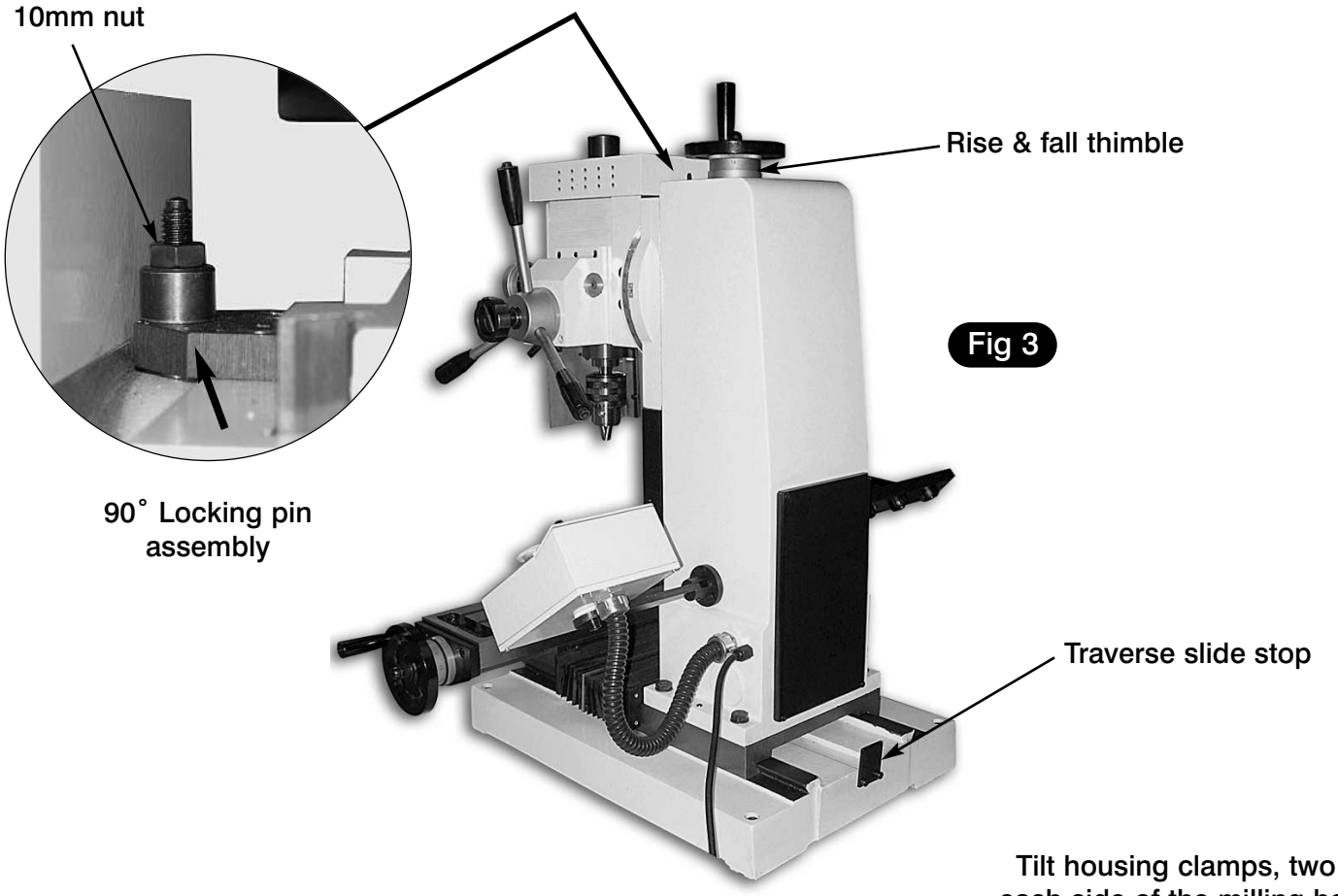

10mm nut
Rise & fall thimble
90˚ Locking pin assembly
Traverse slide stop

Fig 3

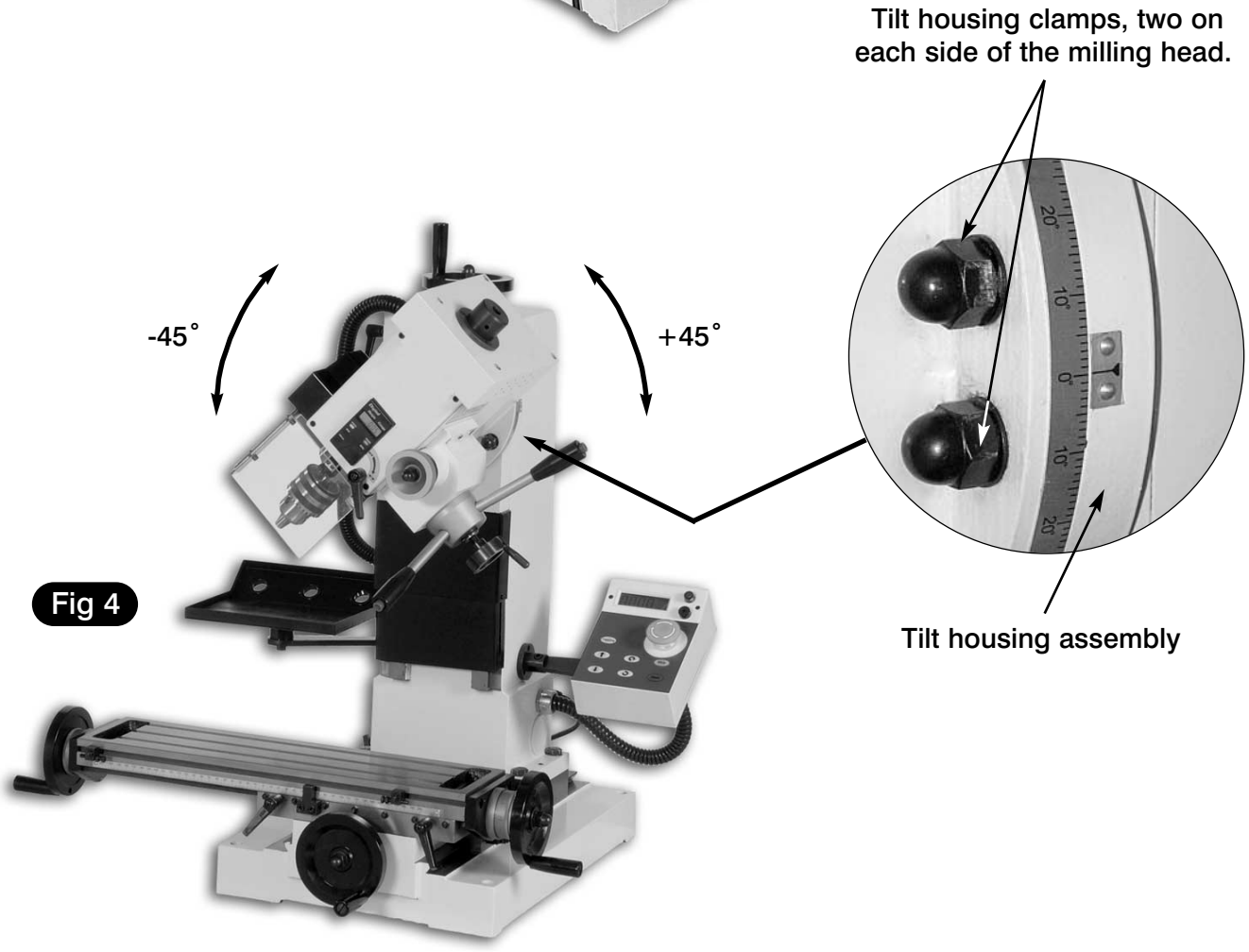

Tilt housing clamps, two on each side of the milling head.
-45˚
+45˚
Tilt housing assembly

Fig 4

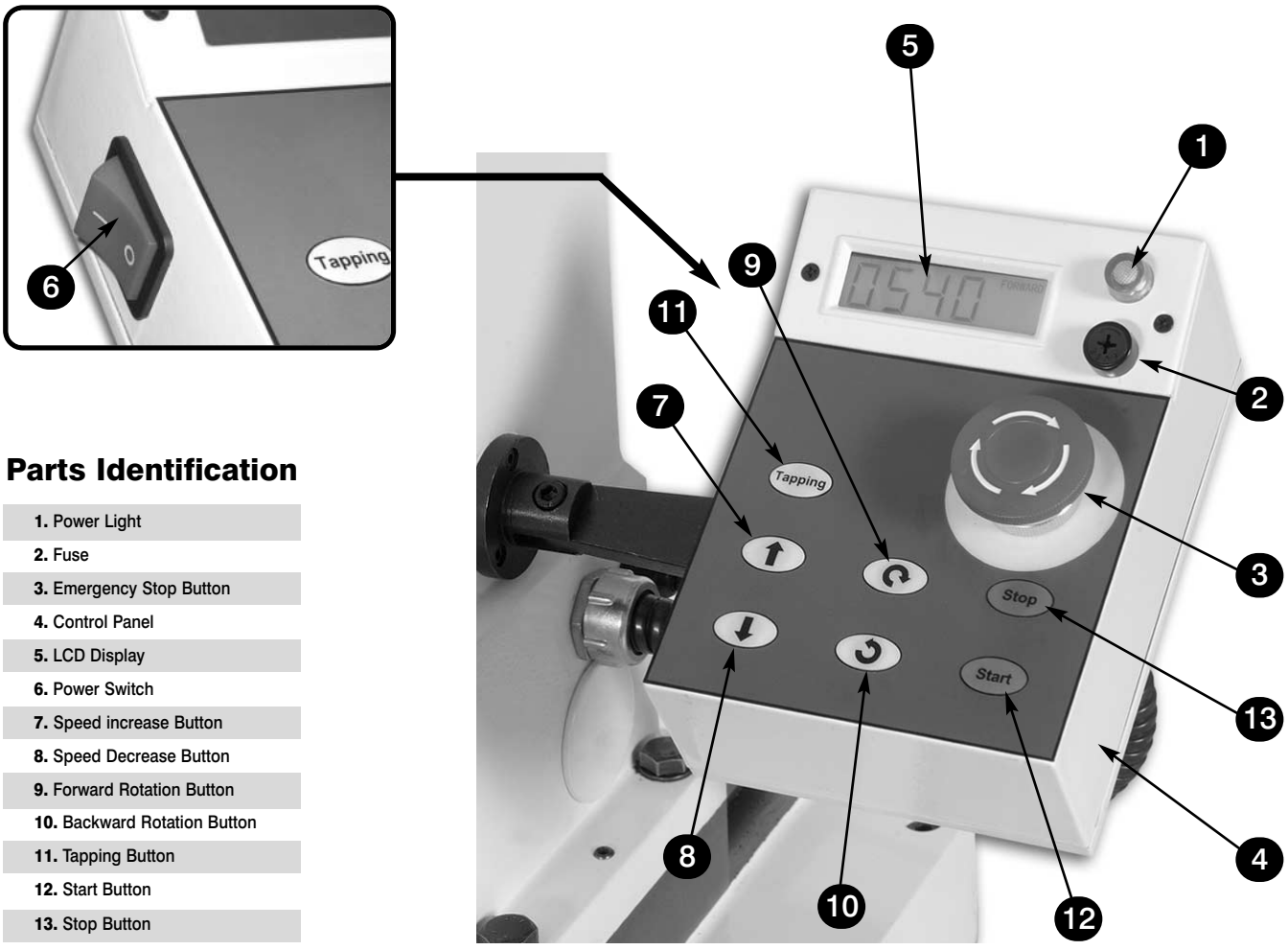
Control Panel

1. Make sure the correct fuse is in the fuse box and the power switch is off. Unlock the emergency stop button, connect the machine to mains and switch on. The power light on the control panel will come on.

2. When the machine is on, press the (start) button, the motor starts up. Press the button ( ) to increase the speed, while pressing ( ) will decrease the speed. Press the ( ) to control the forward rotation, while ( ) controls the backward rotation. Pressing the (TAPPING) button, will slow down the spindle's rotation to 0-500rpm, as above, and the word TAPPING will appear on the controls display. The switches on the handles control the spindles rotation, forward and reverse. Pressing the (STOP) button, will stop the machine.

Note: The circuit boards on the machine has an overload protection function. If the material you are drilling or milling is over excessive volume, it will cause the machine to automatically stop and will display an error message on the LCD, on the control panel.

Remove the material from the machine, reset the machine by switching the power switch on/off and continue with operation.



Parts Identification

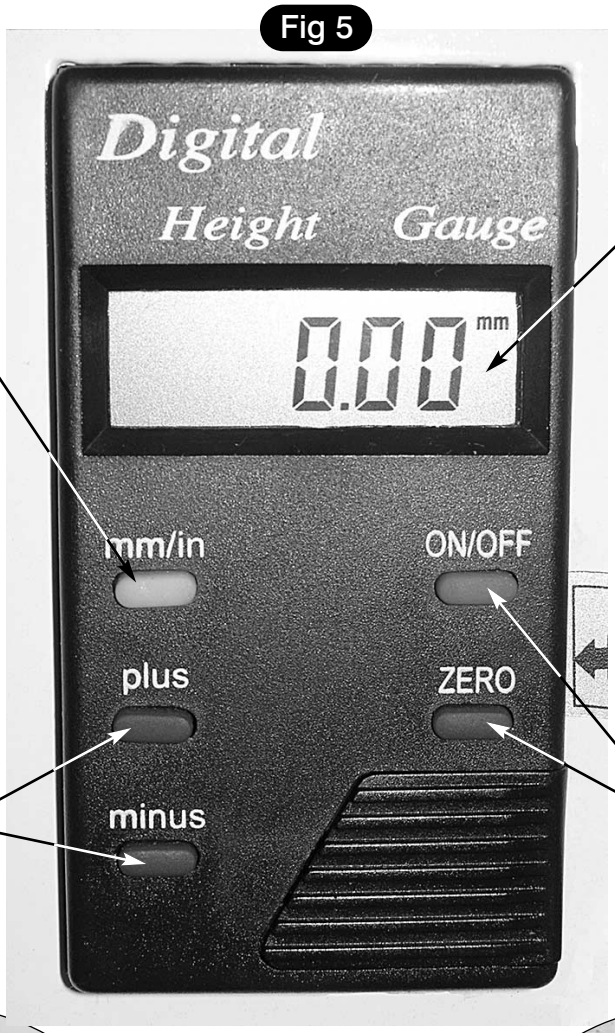
1. Power Light	
2. Fuse	
3. Emergency Stop Button	
4. Control Panel	
5. LCD Display	
6. Power Switch	
7. Speed increase Button	
8. Speed Decrease Button	
9. Forward Rotation Button	
10. Backward Rotation Button	
11. Tapping Button	
12. Start Button	
13. Stop Button	

D.R.O. Control

Digital Read Out (DRO) (Fig 5)
For normal drilling operations press the ON/OFF switch first, and then press the “ZERO” button. Press “mm/in” button to select metric or imperial readings. These two buttons can be effected regardless of the down feed handle position, then you can start drilling. The readings on the display can be amended at any time by pressing “plus” or “minus” buttons.

When displaying error (e.g. no readings or flashing) it means the batteries are low and need replacing. Push against the arrow showing in (Figs 5a & 5b) to open the battery cover, withdraw the battery for replacement. The voltage of the Zinc button batteries is 1.2 volts. After replacement, re-fit the cover.

Fig 5



Min/in

Press “mm/in” button to select metric or imperial readings.

Digital display

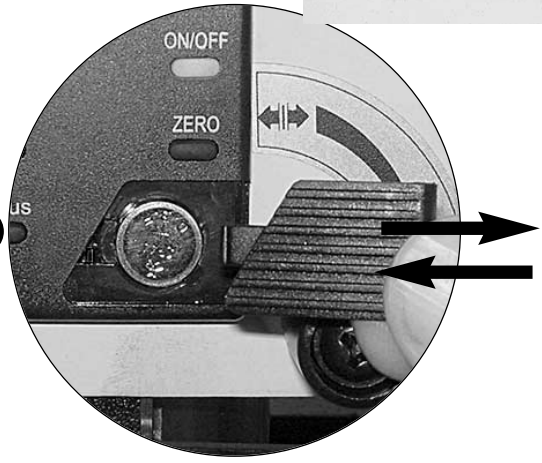
Plus & Minus

The readings on the display can be amended at any time by pressing “plus” or “minus” buttons.

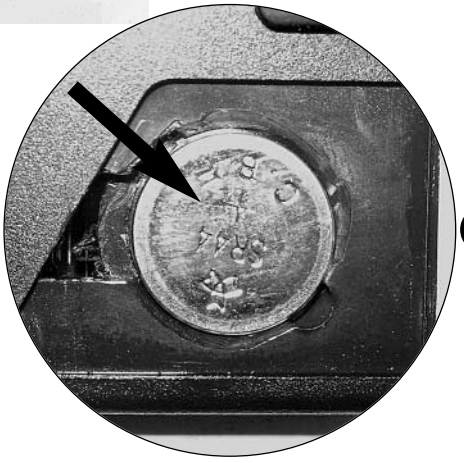
On/Off

For normal drilling operations press the ON/OFF switch first, and then press the “ZERO” button.

Fig 5a



Removing battery cover



1.2 volt zinc button battery

Fig 5b

Engaging the fine feed control

1) Turn the fine feed clutch knob clockwise until it becomes tight **(DO NOT OVERTIGHTEN)**, thus engaging the fine feed control mechanism (See fig 6).

2) Turn the fine feed control knob to lower or raise the spindle in gradual movements (See fig 7).

3) To disengage the fine feed control turn the clutch knob anti-clockwise until it is loose.

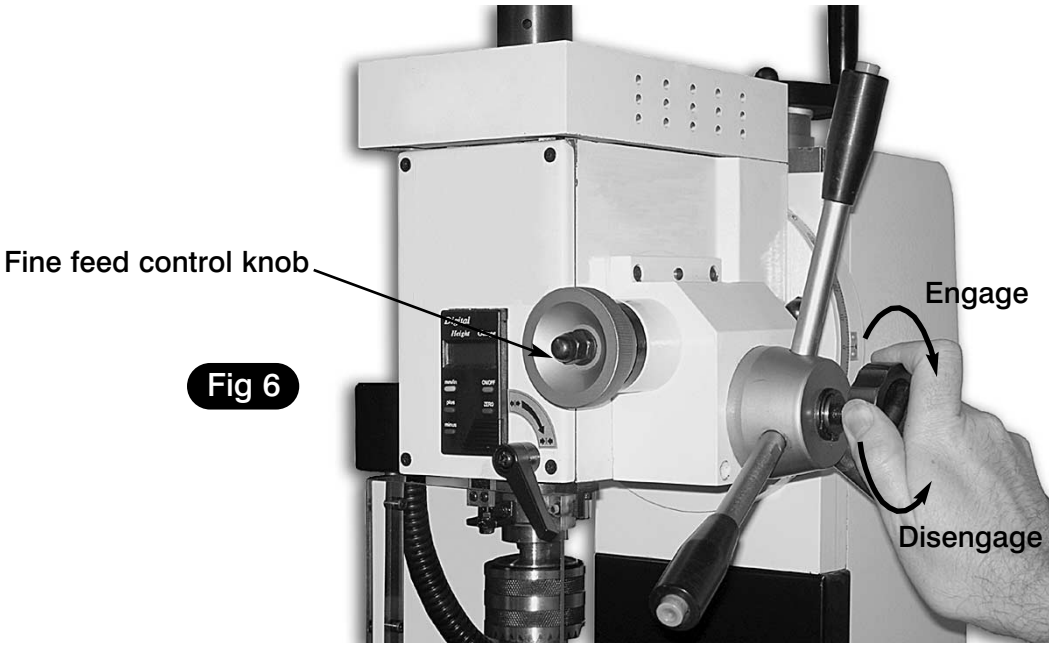


Fig 6

Turn the clutch knob clockwise to engage the fine feed control,turning the knob anti-clockwise will disengage it.

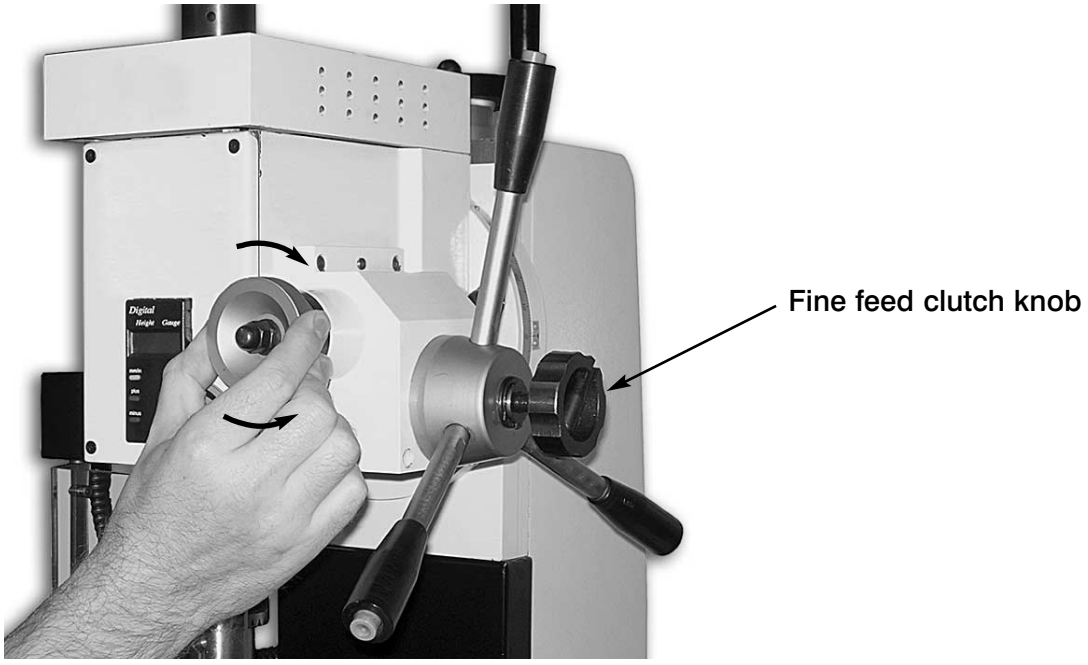


Fig 7

Turn the fine feed control knob to lower or raise the spindle in slow succession

The chuck can be removed and replaced with an optional collet chuck for milling operations. Please follow the instruction below for chuck removal.

DISCONNECT THE MACHINE FROM THE MAINS SUPPLY

1) Unscrew the draw bar cover and safely put to one side (See fig 8). Turn the spindle lock handle clockwise to lock the spindle. (See page 11)

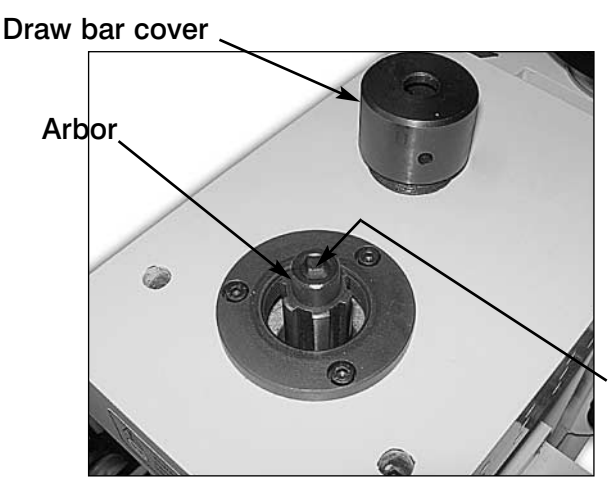


Fig 8

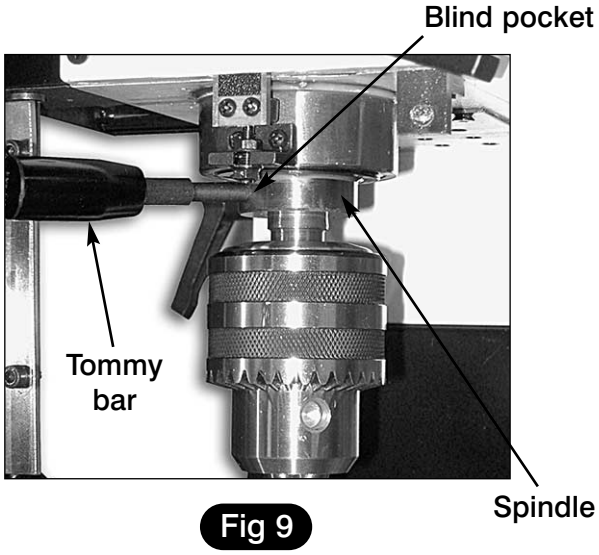


Fig 9

2) Open the chuck guard, locate a 8mm hex key and the tommy bar. Insert the tommy bar into the blind pocket's recess in the spindle (See fig 9), insert the 8mm hex key into the top of the arbor, as shown in figs 8 & 10.

3) While holding the tommy bar rotate the hex key anticlockwise (one turn) until part of the arbor is showing (See fig 10)

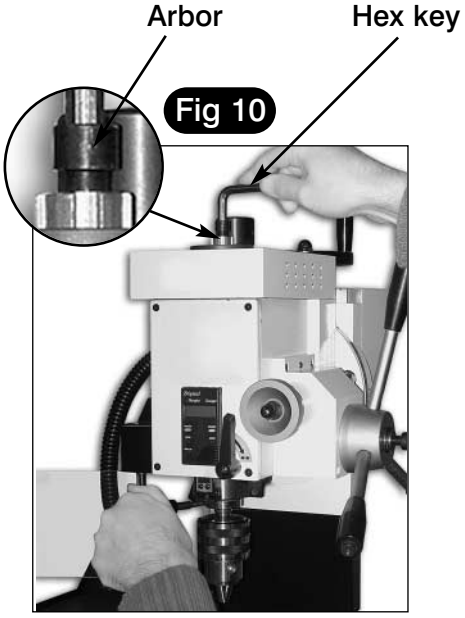


Fig 10

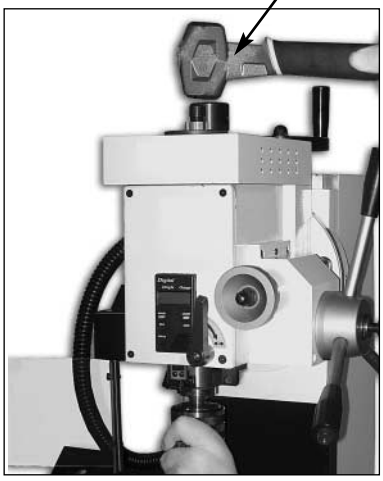


Fig 11

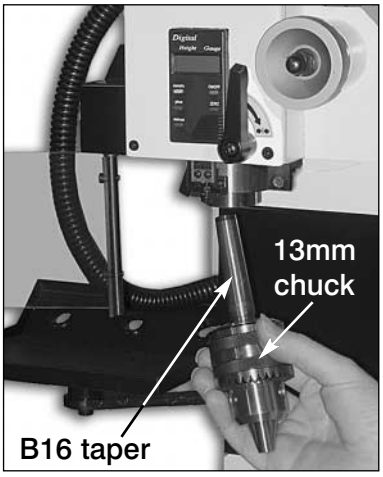


Fig 12

4) Remove the hex key and tommy bar, support the chuck with one hand and using a brass or wooden hammer strike the arbor to release the chuck taper from the spindle taper. Unscrew the chuck from the arbor and remove. (See figs 11 & 12)

Collet Chuck Assembly (Optional)

Fig 13

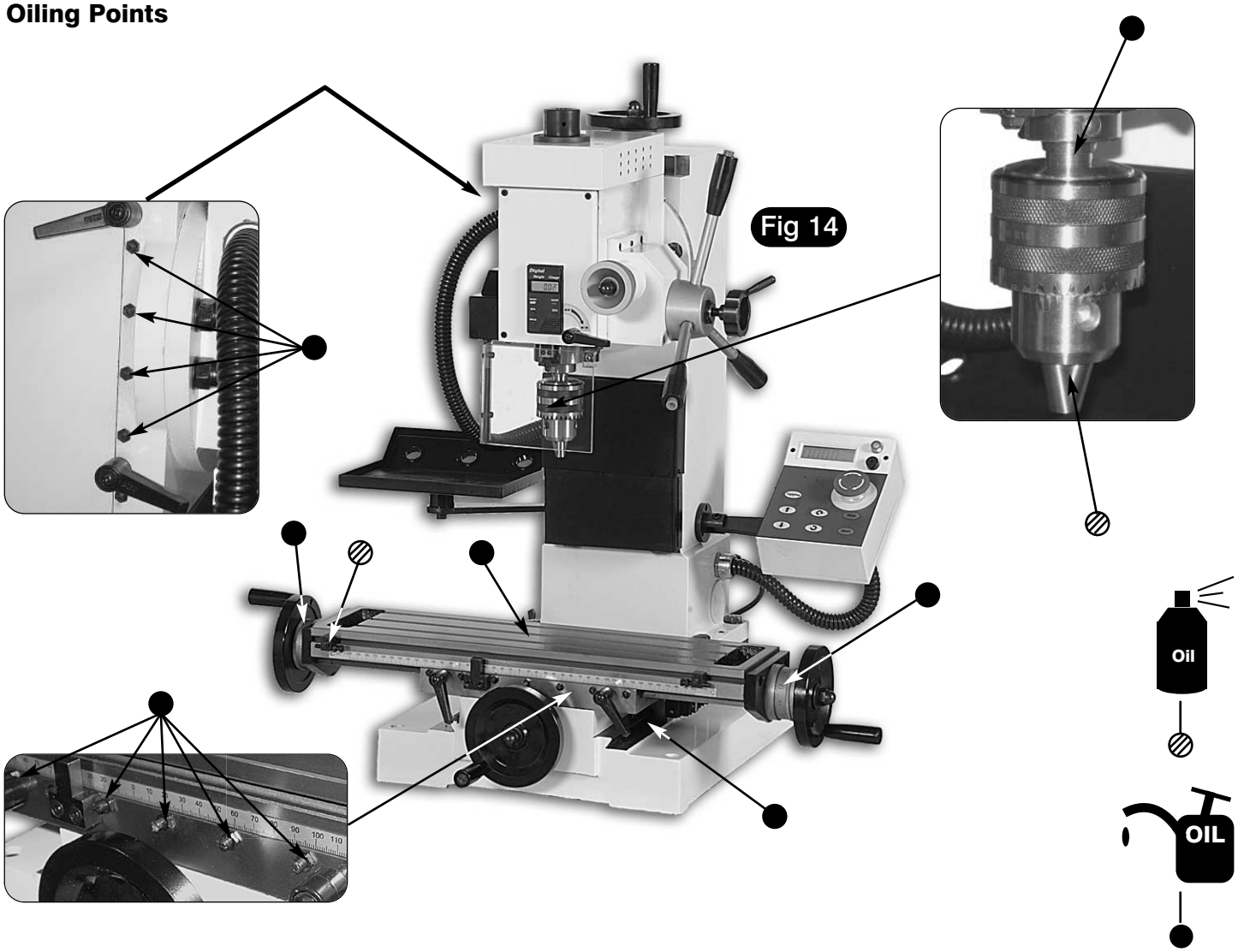
4) Insert the collet chuck into the spindle taper and screw it onto the arbor shaft. Hold the collet chuck, using an adjustable or 'C' spanner (See fig 13). Insert the 8mm hex key into the recess on top of the arbor as shown in figs 8 & 10, while holding the chuck tighten the arbor **(DO NOT OVERTIGHTEN)**

5) Replace the draw bar cover, release the spindle lock handle, reconnect the mill to the mains and continue with the operation.

Maintenance

Oiling Points

Fig 14



Worktable and Traverse feed adjustment

The worktable and the traverse feed are both mounted over dovetail sections. In order to maintain the 'tightness' of the fit; between the sloping surface of the component and its mating surface a gybe strip has been inserted. (At the front of the worktable, and to the left hand side of the traverse feed).

To adjust the gybe strips, use a 8mm spanner and a flat ended screwdriver, release the lock nuts and screw the gybe strip grubscrews clockwise to compensate for any slackness or anti-clockwise to loosen the movement. Check, using the feed handles, that worktable and the traverse feed moves smoothly, If not, repeat the adjustments until the movement is smooth and tight over the whole of the travel. (See figs 15 & 16)

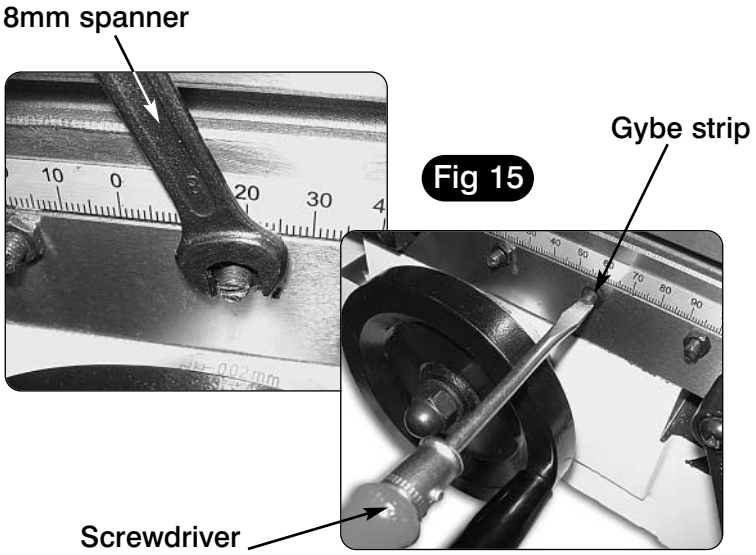
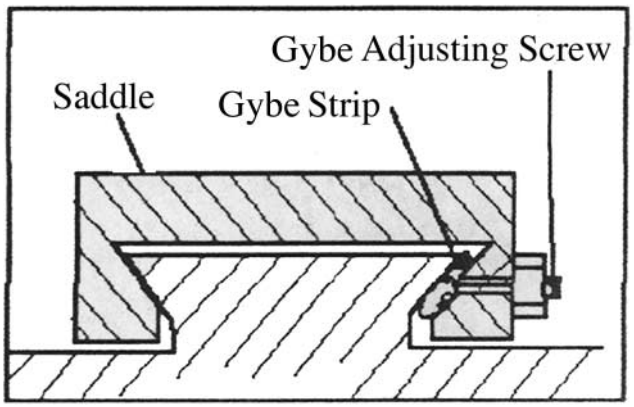


Fig 15

Fig 16



Milling Head adjustment

The Milling Head is mounted over a dovetail section. In order to maintain the 'tightness' of the fit; between the sloping surface of the component and its mating surface, on the left hand side, a gybe strip has been inserted. To adjust the gybe strips, use the supplied 8mm spanner, release the lock nuts and screw the gybe strip grubscrews clockwise to compensate for any slackness or anti-clockwise to loosen the movement. Check, using the rise and fall drive feed handle, that the head moves smoothly, If not, repeat the adjustments until the movement is smooth and tight over the whole of the travel. (See fig 17)

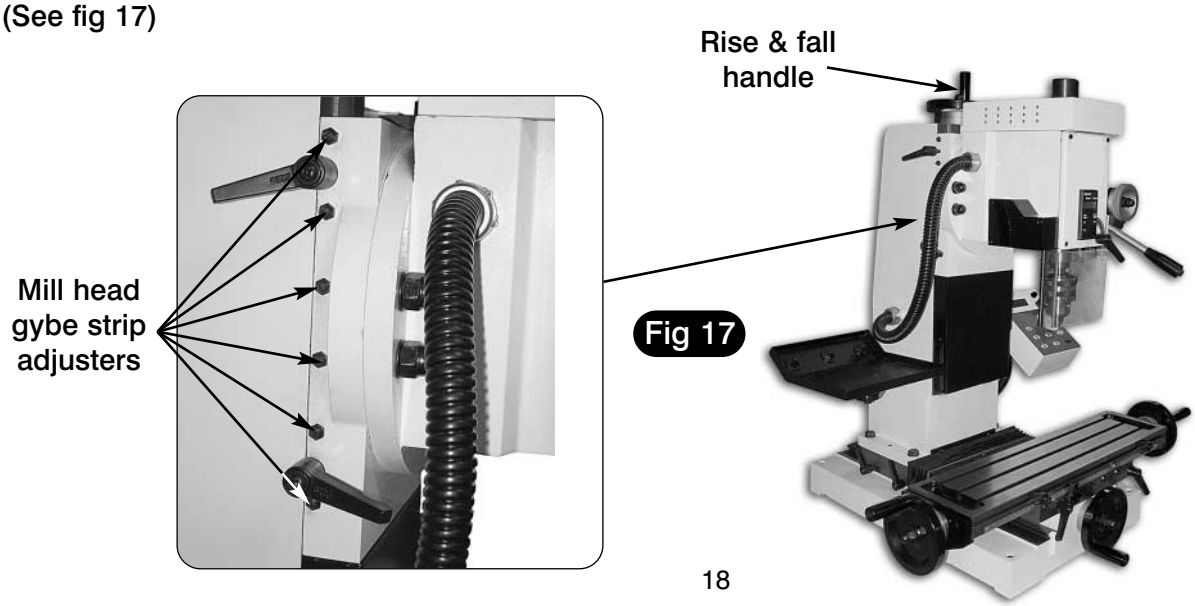


Fig 17

Maintenance

Your Mill is a precision tool. In order to maintain this precision and prolong its useful life, it is advised that you follow the recommended daily and periodic maintenance tables printed below.

Daily and Periodic Maintenance

Daily

1. Carry out a visual inspection. Repair any damage immediately. Minor damage to the beds should be taken out with an oilstone.
2. Move the worktable and the traverse feed back and forth by hand, check that the movement is smooth.
3. Spread a light film of oil over the worktable and the traverse slide bed.
4. Oil the end bearings of the drive shafts. Squirt oil onto the slide faces of mating components. Exercise the components to ensure the oil is spread over both visible and obscure surfaces.

Daily after-use

1. Clean all swarf and chips away from the machine bed, slide surfaces, and the tool post.
2. Exercise the slides and ensure no swarf etc., is lodged in the drive shaft tunnels.
If you have been using a coolant make sure the machine is thoroughly dried off.
3. Check the tool, ensure it is usable the next time, if not re-sharpen or replace the tool tip.
4. Lightly oil spray all the machine beds and surfaces.
5. Clean and lightly oil any tools you may have been using (drill chucks, spanners, chuck keys etc), and put them away.
6. Switch off the power supply. Disconnect the plug.
7. Cover the machine over with a dust cloth.

Weekly

1. Move the traverse slide fully back to give access to the tunnel, blow out to make sure all swarf is cleared away and heavily spray oil the tunnel, exercise the slide to work the oil into the drive thread and to lubricate the dog.
2. Spray oil the slide and the worktable bed, exercise the worktable to spread the oil to all surfaces, both hidden and visible.
3. Spray oil the underside of the machine onto the drive screws, exercise to ensure the oil is coating all components.
4. Clean and spray oil the rise and fall drive screw, exercise to ensure all parts are coated.
5. Check the movement of the worktable, the traverse slide and the head, check they are smooth and 'tight', if necessary reset the gybe strips until the movements are smooth and tight.
6. Wipe the quill outer sleeve clean and lightly oil, exercise the quill to spread the oil in the sleeve bushes.

Monthly

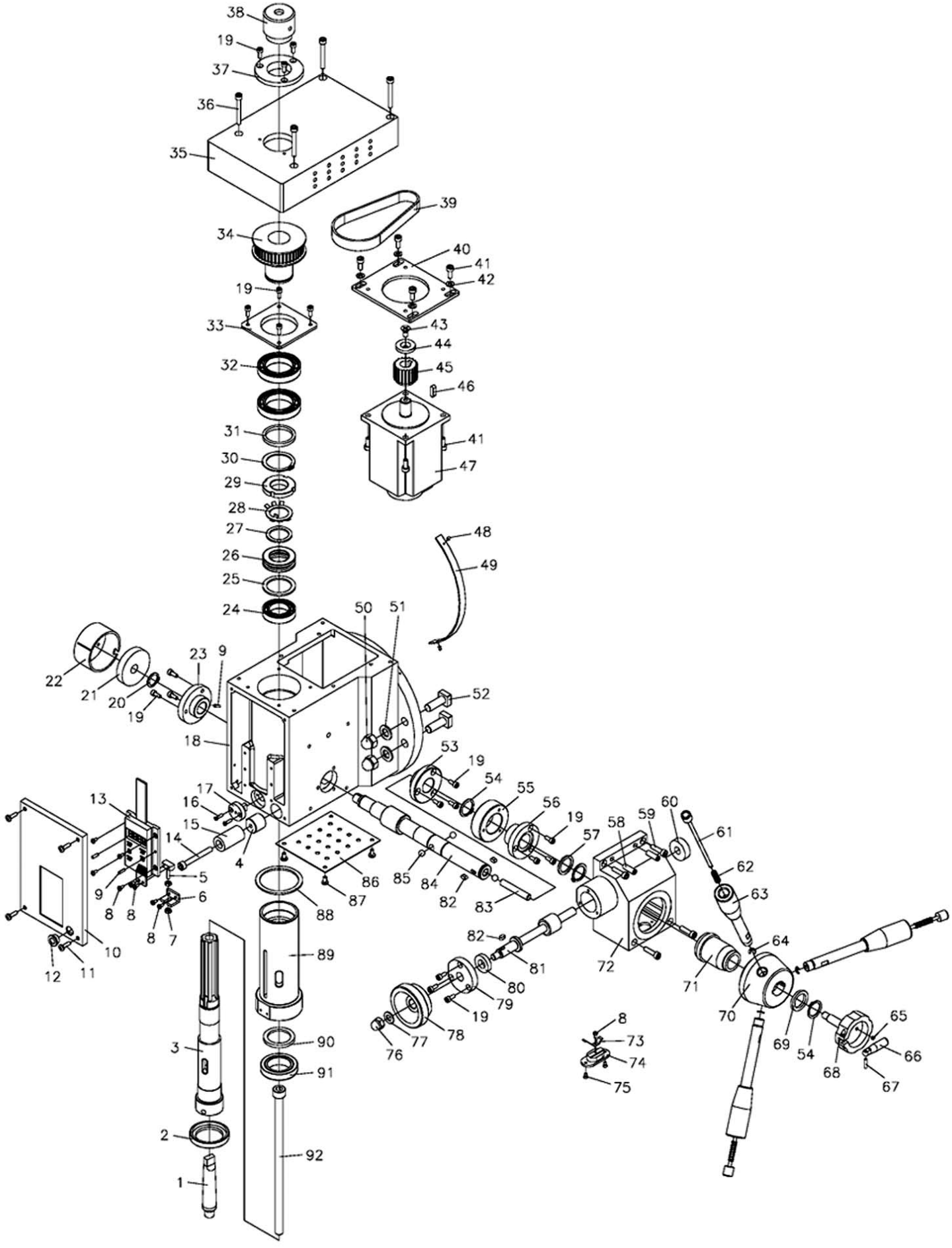
a) Give the motor a good 'blow through' to remove any dust, dirt etc.
b) Check all the interlocks function correctly.

Accessories

There are numerous accessories for the machine listed in the Axminster catalogue.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Motor will not start	1. chuck safety cover is open 2. no power 3. low voltage 4. open circuit in motor or loose connections 5. faulty brush	1.close the chuck safety cover 2.pull out the red emergency stop switch button 3.check power supply for proper voltage 4.inspect all lead connections on motor for loose or open connections 5.replace brushes
Fuses or circuit breakers trip Open	1. short circuit in line cord or plug 2. short circuit in circuit board 3. incorrect fuses or circuit breakers inpower supply	1. inspect cord or plug for damaged insulation and shorted wires and replace extension cord 2. inspect all connections on motor for loose or shorted terminals or wom insulation and repair 3. install correct fuses or circuit breakers
Motor overheats	1. motor overloaded 2. air circulation through the motor restricted	1. Reduce load on motor 2. clean out motor to provide normal air circulation
Cross feed or manual feed handwheel has sloppy operation	1. gibs are out of adjustment 2. handwheel is loose 3. lead screw mechanism wom or out of adjustment	1. tighten gib screw(s) and lubricate bedways 2. tighten handwheel fasteners 3. tighten any loose fasteners on lead screw mechanism
Cross feed or manual feed handwheel is hard to move	1. gibs are loaded up with shavings 2. gibs are too tight 3. bedways are dry	1. remove gibs clean shavings from bedways and dovetails, lubricate, and readjust gibs 2. Loosen gibs screw(s), and lubricate bedways 3. Lubricate bedways and handles

Loud repetitious noise coming from machine	1. gears not aligned in headstock or no backlash 2. broken gear or bad bearing	1. adjust gears and establish backlash 2. replace broken gear or bearing
Machine bogs down during operation	1. excessive depth of cut 2. RPM or feed rate wrong for cutting operation 3. dull cutter 4. bad motor or brush	1. decrease depth of cut 2. refer to RPM feed rate chart for appropriate rates 3. sharpen or replace cutter 4. replace brushes or motor
Bad surface finish	1. wrong RPM or feed rate 2. dull tooling or poor tool selection 3. too much play in gibs	1. adjust for appropriate RPM and feed rate 2. sharpen tooling or select a better tool for the intended operation 3. tighten gibs
Can't remove tapered tool from quill	1. quill had not retracted all the way back into the tailstock 2. debris was not removed from taper before insetting into quill	1. turn the quill handwheel until it forces taper out of quill 2. always make sure that taper surfaces are clean
The spindle can't clamp the end mill	1. choose the wrong end mill 2. the spindle taper is wrong	1. change the end mill 2. check the spindle and change the right spindle
T nuts can't be fixed	1. the T nuts is broken 2. the T slot of the worktable is wrong	1. replace the T nuts 2. replace the worktable or use a whole T slot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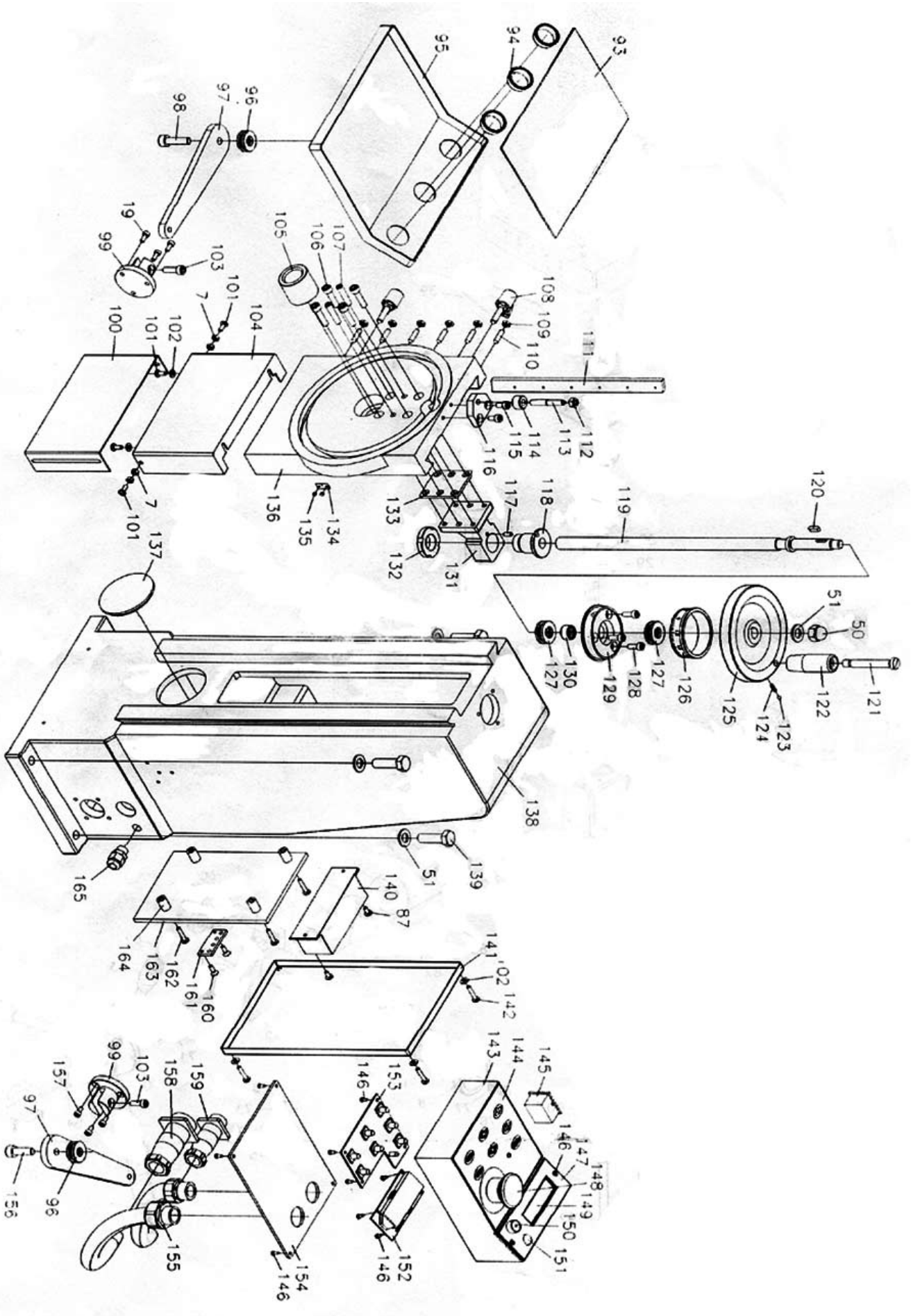
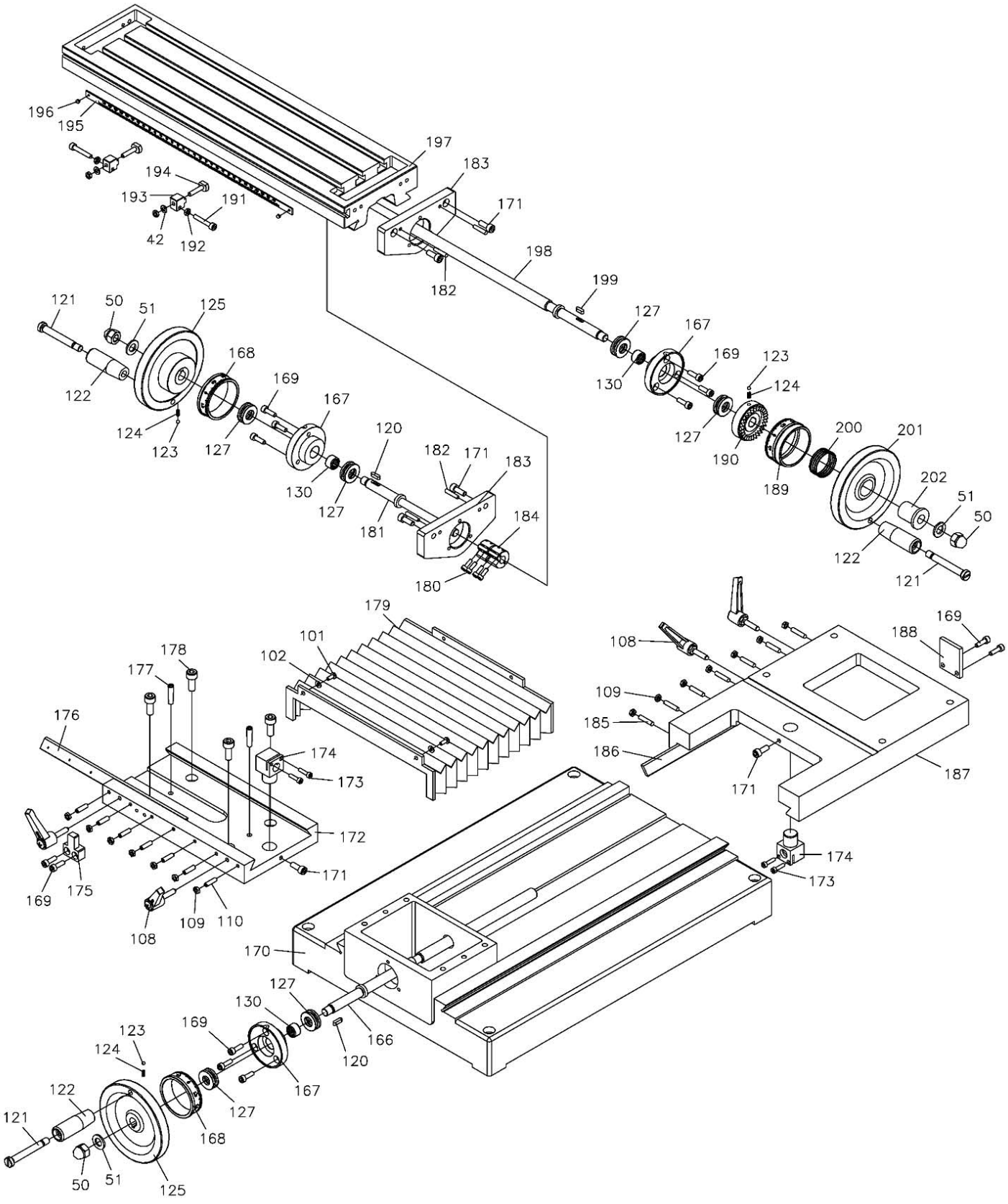
Parts Breakdown Part 2

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Parts List

No	Item No	Description	Qty
1	X10222	Taper shank B12	1
2	XN20222	Spindle oil envelop circle	1
3	XN20208	Spindle	1
4	XN20224	Spindle lock sleeve II	1
5	XN20220	Fixup screw	1
6	XN20221	Fixup support	1
7	GB 6170-86 - M4	Nut M4	6
8	GB 818-85 - M3 x 6	Screw M3*6	9
9	GB 879-86 - 3 x 10	Spring pin 3*10	3
10	XN20213	Spindle box cover (front)	1
11	GB 818-85-M4 x 14	Screw M4*14	4
12	XN20225	Small jacket	1
13	GD300	Display	1
14	GB 70-85 - M6 x 50	Screw M6*50	1
15	XN20226	Spindle lock sleeve I	1
16	GB 819-85 - M3x12	Screw M3*12	2
17	XN20217	Spindle sleeve Orientation shaft	1
18	XN20201	Spindle box cover (front)	1
19	GB 70-85 - M4 x 10	Screw M4*10	22
20	GB 894.1 - 16	Spring check ring 16	1
21	XN20243	Check spring	1
22	X3C0253	Check spring cover	1
23	X3C0252	Left support flange	1
24	GB 278-89 - 1080905	Ball bearing 1080905	1
25	XN20215	Gasket III	1
26	GB 301-84 - 8105	Thrust ball bearing	1
27	XN20214	Gasket II	1
28	GB 858-88 - 24 x 34	Lock washer 24*34	1
29	GB 812-88 - M24x1.5	Round nut M24*1.5	1
30	GB 894.1 - 35	Spring washer 35	1
31	XN20212	Spindle adjust pad	1
32	GB 278-89 - 1080907	Ball bearing 1080907	2
33	XN20211	Bearing set flange	1
34	XN20210	Spindle timing pulley	1
35	XN20209	Spindle box Cover	1
36	GB 70-85 - M5 x 40	Screw M5*40	4
37	XN20205	Flange	1
38	XN20206	Spindle top cover	1
39	HTDM5-320(64 齿)	Timing belt 64	1

40	XN20202	Motor support plate	1
41	GB 70-85 - M5 x 12	Screw M5*12	8
42	GB 97.1-85 - 5	Washer 5	6
43	GB 819-85 - M6x12	Screw M6*12	1
44	XN20204	Washer IV	1
45	XN20203	Motor timing pulley	1
46	GB1096-79- 5 x 16	Key 5*16	1
47	500W	Motor	1
48	GB 867-86 - 2 x 8	Rivet 2*8	2
49	XN20223	Angle ruler	1
50	GB 923-88 - M10	Cap nut M10	8
51	GB 95-85 - 10	Washer 10	12
52	GB8-88 - M10×45	Square bolt M10*45	4
53	XN20241	Left support flange I	1
54	GB 894.1 - 20	Spring check ring 20	3
55	XN20240	Bevel wheel	1
56	XN20239	Bevel wheel fixup steel sleeve	1
57	XN20245	Washer I	1
58	GB 118-86 - 6 x 20	Taper pin 6*20	2
59	GB 70-85 - M5 x 20	Screw M5*20	4
60	XN20229	Set sleeve	1
61	X3C023500	Control shaft assembly	3
62	GB2089-80 0.7×6×25	Compress spring 0.7*6*25	3
63	X3C023600	Control shaft assembly	3
64	GB 896 - 4	Spring washer 4	3
65	Φ4×2	Small magnetism block	1
66	X3C0237	Assistant small handle	1
67	GB 119-86 - A 3 x 14	Round pin 3*14	1
68	X3C0238	Worm wheel lock handle	1
69	XN20237	Gear shaft adjust pad	1
70	XN20238	Big handle seat	1
71	XN2023500	Guide electricity ring assembly	1
72	XN20231	Worm support box body	1
73	X3C0234	Guide electricity bar	1
74	X3C0243	Fixup support	1
75	GB 819-85 - M3x6	Screw M3*6	2
76	GB 923-88 - M8	Cap nut M8	1
77	GB 97.1-85 - 8	Washer 8	1
78	XN20234	Worm gear handle	1
79	XN20233	Worm flange	1
80	XN20232	Worm adjust pad	1
81	XN20230	Worm	1

82	GB1096-79 4 x 8	key 4*8	3
83	XN20236	Lock small shaft	1
84	XN20242	Gear shaft	1
85	GB308-89 - 8	Steel ball 8	3
86	XN20244	Motherboard	1
87	GB 818-85 - M4 x 8	Screw M4*8	6
88	XN20219	Sleeve limited washer	1
89	XN20216	Spindle sleeve	1
90	XN20218	Spindle sleeve envelop oil circle	1
91	GB/T 297-94 - 32906	Prick ball bearing 32906	1
92	XN20207	Suspend lock shank	1
93	XN21904	Rubber pad	1
94	SB-26	Protect line sleeve	3
95	XN2190300	Tray assembly	1
96	GB 301-84 - 8100	Thrust ball bearing 8100	2
97	XN21902	Connect shank	2
98	GB 70-85 - M8 x 30	Screw M8*30	1
99	XN21901	Fixup seat	2
100	XN20901	Z axis cover (II)	1
101	GB 818-85 - M4 x 10	Screw M4*10	6
102	GB 97.1-85 - 4	Washer 4	8
103	GB 70-85 - M6 x 20	Screw M6*20	2
104	XN20902	Rubber pad	1
105	XN20903	Set shank	1
106	GB 70-85 - M6 x 25	Screw M6*25	4
107	GB 118-86 - 6 x 30	Screw taper pin 6*30	2
108	X20218B00	Lock handle	6
109	GB 6174-86 - M5	Nut M5	20
110	GB 71-85 - M5 x 20	Set screw M5*20	13
111	XN20918	Z axis wedge	1
112	GB 6170-86 - M6	Nut M6	1
113	GB 881-86 - 6 x 45	Taper pin 6*45	1
114	XN20906	Quit sleeve	1
115	GB 70-85 - M5 x 10	Screw M5*10	2
116	XN20905	Reposition fix block	1
117	GB 119-86 - A 4 x 10	Column pin	1
118	XN20912	Z axis nut	1
119	XN20915	Z axis leadscrew	1
120	GB1096-79 - 4 x 14	Key 4*14	3
121	XN20911	Handle sleeve screw	4
122	X3C1106	Handle sleeve	4
123	GB308-89 - 4	Ball 4	4

124	GBT2089-1994 0.5×4×12	Compress 0.5*4*12	4
125	XN20907	Handlewheel (I)	3
126	XN20908	Scale ring	1
127	GB 301-84 - 8101	Thrust ball bearing 8101	8
128	GB 70-85 - M5 x 14	Screw M5*14	3
129	XN20909	Z axis bearing seat	1
130	GB 290-89 HK121610	Bearing HK121610	4
131	XN20913	Z axis nut seat	1
132	GB 812-88 - M20x1.5	Notch round nut	1
133	XN20904	Adjust washer	1
134	X21108	Zero label	1
135	GB 867-86 - 2 x 2	Rivet 2*2	2
136	XN20914	Z axis slide plate	1
137	XN20919	Protect cover	1
138	XN20917	Fuselage	1
139	GB 5781-86 - M10x35	Bolt M10*35	4
140	FC-03HB	Filter	1
141	XN20916	Back cover	1
142	GB 818-85 - M4 x 20	Scew M4*20	4
143	XN21801	Control box body	1
144	XN22501	Control box body	1
145	HY12-9	Switch	1
146	GB 846-85 ST2.9x9.5	Screw ST2.9*9.5	14
147	XN21802	Support plate	1
148	Y090	Emergency button	1
149	XN21805	Plastic glass	1
150	HJMF527	Fuse seat	1
151	ZD10	Green light (big)	1
152		Display	1
153	FC350JYA	Button plate	1
154	XN2180300	Fix assembly	1
155	G3/8 软管接头	Tube connect	1
156	GB 70-85 - M8 x 25	Screw M8*25	1
157	GB 70-85 - M4 x 8	Screw M4*8	3
158	16 芯航空接头	Connect	1
159	4 芯航空接头	Connect	1
160	GB 819-85 - M4x12	Screw M4*12	2
161	XN21804	Grounding line	1
162	GB 818-85 - M4 x 20	Screw M4*20	4
163	XMT-W1150	PC Board	1
164	XN21806	Nylon mat	4
165	M12 拉不脱	Draw lock	1

Parts List

166	XN21113	Y axis leadscrew	1
167	XN21117	Y axis bearing seat	3
168	XN21105	Scale ring (I)	2
169	GB 70-85 - M5 x 16	Screw M5*16	13
170	XN21101	Base	1
171	GB 70-85 - M6 x 16	Screw M6*16	6
172	XN21111	Saddle	1
173	GB 70-85 - M4 x 16	Screw M4*16	4
174	XN21114	Copper nut	2
175	XN21112	Fixup bump block	1
176	XN21108	X axis wedge	1
177	GB 118-86 - 6 x 28	Round pin 6*28	2
178	GB 70-85 - M8 x 20	Screw M8*20	4
179	XN21116	Y axis guide protect cover	1
180	GB 70-85 - M4 x 12	Screw M4*12	4
181	XN21118	Leadscrew shaft	1
182	GB 117-86 - A 4 x 22	Round taper pin 4*22	4
183	XN21104	Bearing seat fix plate	2
184	XN21119	Connect shaft organ	1
185	GB 71-85 - M5 x 25	Set screw M5*25	7
186	XN21110	Y axis wedge	1
187	XN21103	Y axis slide plate	1
188	XN21106	Limited block	1
189	XN21124	Scale ring (II)	1
190	XN21123	Clutch	1
191	GB 70-85 - M5 x 30	Screw M5*30	2
192	GB 6172-86 - M5	Nut M5	4
193	XN21115	Movement support	2
194	XN21107	T bolt	2
195	X21128A	Rule	1
196	GB 867-86 - 2.5 x 6	Revit 2.5*6	2
197	XN21109	Worktable	1
198	XN21102	X-axis leadscrew	1
199	GB1096-79- 4 x 12	Key 4*12	1
200	XN21120	Compress spring	1
201	XN21122	Handlewheel (II)	1
202	XN21121	Lock sleeve	1

Please dispose of packaging for the product in a responsible manner. It is suitable for recycling. Help to protect the environment, take the packaging to the local recycling centre and place into the appropriate recycling bin.

Only for EU countries

Do not dispose of electric tools together with household waste material. In observance of European Directive 2002/96/EC on waste electrical and electronic equipment and its implementation in accordance with national law, electric tools that have reached the end of their life must be collected separately and returned to an environmentally compatible recycling facility.

Axminster Tool Centre,
Unit 10 Weycroft Avenue, Axminster, Devon EX13 5PH

axminster.co.uk